

**REMARKS**

In this response, Applicants have amended claims 8 and 13. Following entry of these amendments, claims 8-10 and 13 are pending in the application.

**Abstract**

The Abstract was objected to as containing grammatical errors. The Abstract has been replaced, thus respectfully overcoming the objection thereto.

**Rejection Under 35 U.S.C. § 112, Second Paragraph**

Claims 8 and 13 stand rejected under 35 U.S.C. § 112, second paragraph. Claims 8 and 13 have been amended, thus respectfully overcoming the rejections thereto.

**Rejection Under 35 U.S.C. § 102**

Claims 8-10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by JP 07-01346 to Mizuno (hereafter "Mizuno"). Applicants respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 8-10 and 13 were rejected over Mizuno because the boundary layer (16) of Mizuno is carried out with a hydrophilic treatment. The boundary layer (16) is formed by the carbon particles which are made into a paste using NAFION™ which is the same material used for the catalyst layer (12,14) of the fuel cell (column 0023). Applicants agree that the carbon particles of the boundary layer (16) are granted hydrophilic properties when made into the paste. However, the result is that the carbon particles of the catalyst layer (12,14) are conditioned with same hydrophilic properties as the boundary layer (16).

Accordingly, Applicants submit that does not teach that the hydrophilic properties of the carbon particles of boundary layer (16) and of the catalyst layer (12,14) are different or that the hydrophilic properties of the boundary layer (16) are higher than the catalyst layer (12,14). In pending claims 8 and 13, as amended, the hydrophilic characteristics of the conductive particles of the boundary layer (3) are higher than that of the catalyst layer (2) of claims 8 and 13 of the present invention. This is achieved because the hydrophilic treatment is carried out on the conductive particles in the boundary layer (3) so that the hydrophilic

characteristics becomes higher than if the catalyst layer (2), where the hydrophilic treatment is not carried out.

As disclosed on page 14, lines 33 to page 15, lines 23 of the specification as originally filed, there are technical advantages to the claimed structure. Because the conductive particles in the boundary layer (3) do not carry catalysts, the electrochemical reaction and the combustion reaction do not occur in the boundary layer (3) and the temperature in the boundary layer (3) is lower than in the catalyst layer (2). However, un-reacted hydrogen gases tend to remain in the boundary vicinity between the boundary layer (3) and the catalyst layer (2). Accordingly many electrochemical reactions of the un-reacted hydrogen gases and many combustion reactions with the oxygen are performed in the catalyst layer (2) close to the border to boundary layer(3), possibly resulting in an increase of temperature.

On the other hand, carrying out the hydrophilic treatment on the boundary layer (3) allows water to be reserved inside the boundary layer (3), whereby heat conductivity of the boundary layer (3) is increased and heat of the catalyst layer (2) generated in the border vicinity of the boundary layer (3) is quickly transmitted to the boundary layer (3) having a lower temperature to avoid a temperature increase in the local part of the electrolytic membrane (1) close to the border to the catalyst layer(2).

For these reasons, Applications believe that claim 8 and 13 are distinguishable from the teachings of Mizuno.

### **Conclusion**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely

acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date March 8, 2010

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